

IN THE CLAIMS

1-12 (Cancelled)

Claim 13 has been amended as follows:

13. (Currently Amended) A magnetic resonance imaging apparatus comprising:

a static magnetic field source having two opposite faces connected by a magnetic return structure, said opposite faces facing each other and being separated by a space configured adapted to receive an examination subject therein;

first and second assemblies respectively mounted at said opposite faces, said first and second assemblies each being comprised of a plurality of components with the components in said first assembly being disposed mirror-symmetrically, ~~mirror-symmetrically~~ relative to a plane proceeding through said space, with respectively respect to the components in the second assembly;

said components in each of said first and second assemblies comprising, in a sequence from one of said opposite faces toward said plane, a pole plate, a pole piece, gradient coils having an annular exterior, an RF transmission coil, a passive first shimming ring disposed at the annular exterior of said gradient coils, and a passive second shimming ring disposed at said annular exterior of said gradient coils adjacent to said first shimming ring; and

said second shimming ring in each of said first and second assemblies being mounted to allow adjustment of a distance of said second shimming ring from the first shimming ring in that assembly.

14. (Previously Presented) A magnetic resonance imaging apparatus as claimed in claim 13 wherein, in each of said first and second assemblies, said RF transmitting coil has a face facing said plane, and said second shimming ring has a

face facing said plane, with said face of said second shimming ring being no closer to said plane than said face of said RF transmitting coil.

15. (Previously Presented) A magnetic resonance imaging apparatus as claimed in claim 13 wherein said space has a center point and wherein said static magnetic field source, at each of said opposite faces, comprises a plurality of groups of permanently magnetic columns respectively having different magnetic energy levels, said columns being disposed substantially symmetrically relative to an axis proceeding through said center point and a centered one of said plurality of magnetic columns in each of said first and second assemblies, with the respective magnetic energy levels of said centered ones of said plurality of magnetic columns respectively in said first and second assemblies being equal.

16. (Previously Presented) A magnetic resonance imaging apparatus as claimed in claim 15 wherein, in each of said first and second assemblies, the respective, different magnetic energy levels are axially symmetric with respect to said axis, and wherein said plurality of permanently magnetic columns in each of said first and second assemblies includes a magnetic column formed as an annular ring centered relative to said axis, with the respective magnetic energy levels of said magnetic column formed as an annular ring in the respective first and second assemblies are equal.

17. (Previously Presented) A magnetic resonance imaging apparatus as claimed in claim 16 wherein, in each of said first and second assemblies, magnetic columns in said plurality of magnetic columns that are disposed farther from said axis have a higher magnetic energy level than magnetic columns in said plurality of columns disposed closer to said axis.

18. (Previously Presented) A magnetic resonance imaging apparatus as claimed in claim 15 wherein, in each of said first and second assemblies, said plurality of permanently magnetic columns is three, each of said permanently magnetic columns being annular and producing an external annular area having a magnetic energy level N3, a middle annular area having a magnetic energy level N2, and an inner annular area having a magnetic energy level N1, with N3>N2>N1.

19. (Previously Presented) A magnetic resonance imaging apparatus as claimed in claim 15 comprising, in each of said first and second assemblies, a plurality of magnetic bolts, selected from the group consisting of magnetically conductive bolts and permanently magnetic bolts, respectively disposed substantially parallel to, and symmetrically with respect to, said axis in at least one of said pole plate, one or more of said permanently magnetic columns, said first shimming ring or said second shimming ring, to shim the static magnetic field generated by said static magnetic field source.

20. (Previously Presented) A magnetic resonance imaging apparatus as claimed in claim 13 comprising, in each of said first and second assemblies, a plurality of magnetic bolts, selected from the group consisting of magnetically conductive bolts and permanently magnetic bolts, disposed symmetrically at an exterior edge of at least one of said static magnetic field source, said pole plate, said first shimming ring, or said second shimming ring, to shim the static magnetic field generated by said static magnetic field source.

Claim 21 has been amended as follows:

21. (Currently Amended) A magnetic resonance imaging apparatus comprising:

a static magnetic field source having two opposite faces connected by a magnetic return structure, said opposite faces facing each other and being separated by a space ~~adapted~~ configured to receive an examination subject therein, said space having a center point;

first and second assemblies respectively mounted at said opposite faces, said first and second assemblies each being comprised of a plurality of components with the components in said first assembly being disposed ~~mirror~~ symmetrically mirror-symmetrically, relative to a plane proceeding through said space, with ~~respective~~ respect to the components in the second assembly; and

22. (Previously Presented) A magnetic resonance imaging apparatus as claimed in claim 21 wherein, in each of said first and second assemblies, the respective, different magnetic energy levels are axially symmetric with respect to said axis, and wherein said plurality of permanently magnetic columns in each of said first and second assemblies includes a magnetic column formed as an annular ring centered relative to said axis, with the respective magnetic energy levels of said magnetic column formed as an annular ring in the respective first and second assemblies are equal.

23. (Previously Presented) A magnetic resonance imaging apparatus as claimed in claim 22 wherein, in each of said first and second assemblies, magnetic columns in said plurality of magnetic columns that are disposed farther from said axis have a higher magnetic energy level than magnetic columns in said plurality of columns disposed closer to said axis.

24. (Previously Presented) A magnetic resonance imaging apparatus as claimed in claim 22 wherein, in each of said first and second assemblies, said plurality of permanently magnetic columns is three, each of said permanently magnetic columns being annular and producing an external annular area having a magnetic energy level N3, a middle annular area having a magnetic energy level N2, and an inner annular area having a magnetic energy level N1, with N3>N2>N1.

25. (Previously Presented) A magnetic resonance imaging apparatus as claimed in claim 21 comprising, in each of said plurality of permanently magnetic columns at the respective opposite faces of said static magnetic field source, a plurality of magnetic bolts, selected from the group consisting of magnetically conducting bolts and permanently magnetic bolts, disposed symmetrically relative to said axis and proceeding substantially parallel to said axis, to shim the static magnetic field generated by the static magnetic field source.

Claim 26 has been amended as follows:

26. (Currently Amended) A method for shimming a static magnetic field in a magnetic resonance imaging apparatus, said apparatus comprising a static

magnetic field source having two opposite faces connected by a magnetic return structure, said opposite faces facing each other and being separated by a space adapted configured to receive an examination subject therein, first and second assemblies respectively mounted at said opposite faces, said first and second assemblies each being comprised of a plurality of components with the components in said first assembly being disposed ~~mirror-symmetrically~~ mirror-symmetrically, relative to a plane proceeding through said space, with respective respect to the components in the second assembly; said method comprising the steps of:

in each of said first and second assemblies, including in the mirror-symmetric components thereof a passive first shimming ring, and a passive second shimming ring disposed adjacent to said first shimming ring; and

adjustably mounting said second shimming ring relative to said first shimming ring and selectively adjusting a distance between said second shimming ring and said first shimming ring to shim said static magnetic field.

27. (Previously Presented) A method as claimed in claim 26 comprising the additional step, for shimming said static magnetic field of:

in each of said first and second assemblies, inserting a symmetrical arrangement of magnetic bolts, selected from the group consisting of magnetically conductive bolts and permanently magnetic bolts.

Claim 28 has been amended as follows:

28. (Currently Amended) A method for shimming a static magnetic field in a magnetic resonance imaging apparatus, said apparatus comprising a static magnetic field source having two opposite faces connected by a magnetic return structure, said opposite faces facing each other and being separated by a space adapted configured to receive an examination subject therein, said space having a center point, first and second assemblies respectively mounted at said opposite faces, said first and second assemblies each being comprised of a plurality of

components with the components in said first assembly being disposed ~~mirror~~ ~~symmetrically~~ mirror-symmetrically, relative to a plane proceeding through said space, with ~~respective~~ respect to the components in the second assembly; said method comprising the steps of:

in said static magnetic field source, at each of said two opposite faces, providing a permanently magnetic arrangement to generate said static magnetic field; and

dividing each of said permanently magnetic arrangements into a plurality of permanently magnetic columns respectively having different magnetic energy levels, and disposing the plurality of permanently magnetic columns at each of said opposite faces symmetrically relative to an axis proceeding through said center point of said space and oriented perpendicularly to said plane, and making the magnetic energy levels equal for respective permanently magnetic columns in each plurality of permanently magnetic columns through which said axis proceeds.

29. (Previously Presented) A method as claimed in claim 28 comprising:

in each plurality of permanently magnetic columns, making the respective magnetic energy levels of columns farther from said axis higher than the respective magnetic energy levels of columns closer to said axis.

30. (Previously Presented) A method as claimed in claim 26 comprising the additional step, for shimming said static magnetic field of:

in each of said first and second assemblies, inserting a symmetrical arrangement of magnetic bolts, selected from the group consisting of magnetically conductive bolts and permanently magnetic bolts.